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Report No. 13-04

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ABSTRACT Tobacco use among young adults is a major public health challenge. Near-term benefits of cessation may motivate active young people to quit or avoid smoking. Military basic training includes mandatory tobacco cessation, as well as uniform physical conditioning regimes, creating an opportunity to evaluate changes in physical performance metrics in direct relation to smoking cessation. These analyses included data from all men who completed Marine Corps recruit training in San Diego, California, between 2002 and 2006. Recruits reported tobacco use and other health metrics on a pretraining survey. Initial and final aerobic run-times were recorded over the 3-month training period. Multivariable linear regression analyses assessed changes in run-speed relative to pre-enlistment smoking history. Among 52,419 young men included in analyses, 13,248 (25.3%) reported smoking before enlistment. Average run-speeds improved among all groups of recruits; however, improvement was greater among prior smokers compared to recruits with no history of smoking (average increase of 0.31 vs. 0.21 miles per hour) and statistically significant in multivariate analyses. Smoking cessation in this cohort of young men resulted in improved physical aerobic performance, independent of other behavioral health characteristics. These data may be useful in promoting and motivating smoking cessation among young, active adults.

INTRODUCTION

Smoking remains the leading cause of preventable morbidity and mortality in the United States.¹ Although public health initiatives have reduced the prevalence of tobacco use, dramatic improvements observed in the last century have slowed to more subtle declines in smoking rates among adults over the past 10 years.^{2,3} Approximately 20% of U.S. adults are estimated to be current smokers, with higher proportions noted among men, those with lower socioeconomic status, and those in some labor-related occupations.^{4,5} Smoking among adolescents and young adults may be a particularly challenging public health issue, with more than 18% of high school students classified as current smokers.⁴ In the military, the prevalence of smoking among members ages 18 to 25 has been estimated to be as high as 38%, with the highest proportion of smokers in the Marine Corps.⁶

As many as 25% to 50% of young male smokers cite improved physical performance as a potential motivation to quit smoking.⁷⁻⁹ Quantifiable measures of cardiopulmonary fitness, such as maximal oxygen consumption (VO₂ max), running speeds, and pulmonary function tests have been shown to be generally superior among nonsmokers when compared to smokers.¹⁰⁻¹² These findings, however, cannot be used to conclude that quitting smoking leads to improvement in fitness. Studies that have demonstrated improvements in lung function after smoking cessation have generally evaluated populations after voluntary cessation,^{13,14} which may coincide with other healthy lifestyle choices, such as changes in diet and physical activity. These issues make it difficult to quantify the true effect of smoking cessation on improvements in fitness and athletic performance.

The U.S. military has a strong interest in high levels of fitness for its service members.¹⁵ Military recruit training is a unique environment that prohibits all tobacco use and compels a structured living situation for young adults. Under close supervision over several weeks, recruits perform the same physical activities and consume very similar diets. They are allowed no weekend breaks, no alcohol use, no television, or other influences from outside their controlled environment. Recruit training therefore provides an opportunity to evaluate the physiologic effect of smoking cessation on physical performance, controlling for other lifestyle factors. Based on this background, we leveraged several rich data sources¹⁶⁻¹⁸ among Marine Corps recruits undergoing basic training in San Diego, California, to quantify the impact of smoking cessation on a measure of aerobic fitness among healthy young men.

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Results of this project were previously presented and received an award at the Navy Academic Research Competition, Bethesda, MD, May 2013.

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doi: 10.7205/MILMED-D-14-00370

METHODS

Study Population

The population included all men who completed recruit training at the Marine Corps Recruit Depot in San Diego, California, between January 1, 2002 and December 31, 2006, and who completed a baseline survey as part of the Recruit Assessment Program (RAP). Marine Corps recruit training covers 12 weeks, in which all tobacco users endure enforced abstinence. The RAP survey is voluntarily completed after consent by more than 95% of recruits during in-processing. The RAP survey was developed through a collaborative effort involving public health officials, clinicians, and researchers from the Department of Defense, Veterans Health Administration, and Department of Health and Human Services.^{16–18} The RAP is the only known military database that systematically collects preservice data on Marine Corps trainees and can also be linked to other military databases including administrative training records. The confidential survey instrument includes more than 100 questions on pre-enlistment demographics, health symptoms and conditions, family history, tobacco and alcohol use, and diet and exercise.

This project was conducted in compliance with all applicable federal regulations governing the protection of human participants in research and was approved by the Institutional Review Board of the Naval Health Research Center (protocol NHRC.2000.0003).

Outcome

The study outcome was the change in aerobic running speed between baseline (entry into recruit training) and the final week of training. The baseline fitness test was conducted 2 to 4 days after arrival and included measured height and weight, and a timed 1.5-mile run. At the end of training, usually 77 days after the initial fitness test, each individual completed a final fitness test, which included the same components as the initial test, except that the timed 1.5 miles was replaced with a timed 3.0-mile run. Run-time data were part of administrative training records, linked to RAP survey data for this project.

Exposure of Interest

The exposure of interest was smoking history assessed at the time of in-processing. The RAP survey instrument included the following two questions on tobacco use: "Have you smoked more than 100 cigarettes (5 packs) in your entire life?" (yes/no), and "When did you last smoke a cigarette?" (I have never smoked/More than 1 year ago/More than 1 month ago/More than 1 week ago/Within the last few days). Individuals who answered "yes" to the lifetime smoking question were classified as "smokers," and stratified into two subgroups: those who affirmed smoking their last cigarette within the last month were categorized as "current smokers" and those who reported smoking their last cigarette more than 1 month ago as

"former smokers." Data from those reporting past use of smokeless tobacco were excluded from the analysis.

Covariates

Body mass index (BMI) was determined using standardized weight and height measures obtained at the baseline fitness test. Survey data captured age, race/ethnicity, history of asthma (yes/no), history of shortness of breath (yes/no), high school athletic team participation (0, 1, 2, or 3 or more teams), preservice exercise frequency (0, 1, 2, 3, 4–5, or 6 or more times per week), history of fast-food consumption (0, 1, 2–3, 4–7, 8–14, or 15 or more times per week), and preservice history of television watching (0, 1, 2–3, or 4 or more hours per day).

Statistical Analysis

Since the final run distance was twice as long as the baseline distance, the recorded run-times were transformed into run-speeds, measured in miles per hour (mph). The change in run-speed between the baseline and final test was calculated. Univariate analyses (*t*-tests and analysis of variance) were used to investigate unadjusted associations between the mean changes in run-speed and smoking status (nonsmoker, former smoker, and current smoker). Covariates included BMI, self-reported asthma, shortness of breath, high school athletic team participation, exercise frequency, fast-food consumption frequency, and time spent watching television. Initial analyses were conducted to assess the presence of multicollinearity by using a variance inflation factor of 4 or greater. Multivariable linear regression assessed the significance of smoking status on the change in run-speed while adjusting for covariates. Significant associations between the change in run-speeds and smoking status included an investigation of possible confounding while adjusting for all other variables in the model. Variables were considered confounders if they changed the measure of association (beta coefficient for smoking) by more than 10%. Variables that were not significant in the models ($p \geq 0.05$) or were not confounders were removed from the models using a backward elimination process. Regression diagnostics, and model fit by r^2 , were performed. All analyses were completed using Statistical Analysis System software, version 9.3 (SAS Institute, Cary, North Carolina).

RESULTS

Study Population Characteristics

Data from a total of 52,419 individuals were evaluated. All participants were men who completed Marine Corps recruit training. Table I shows that the majority (71%) were ages 18 to 19 years, and most (84%) reported Caucasian race/ethnicity. On arrival to training, 18% were current smokers, 7% were former smokers, and 75% were nonsmokers. A history of asthma was self-reported by 1.5% of recruits, and shortness of breath was reported by 2.3%. BMI at entry was within the normal standards (18.5–24.9 kg/m²) for 60% of recruits; 33% had a BMI of 25.0 to 29.9 kg/m² and 4% had a

TABLE I. Baseline Characteristics of Population, by Smoking Status, on Arrival at Marine Corps Recruit Training

Characteristic	All Recruits (52,419), n (%)	Recruits Who Never Smoked (39,171), n (%)	Recruits With Any History of Smoking (13,248), n (%)
Age, Years			
18–19	37,245 (71.05)	29,172 (74.47)	8,073 (60.94)
20–28	15,174 (28.95)	9,999 (25.53)	5,175 (39.06)
Race/Ethnicity			
Caucasian	43,940 (83.82)	32,577 (83.17)	11,363 (85.77)
Asian/Pacific Islander	2,169 (4.14)	1,635 (4.17)	534 (4.03)
Black	1,988 (3.79)	1,679 (4.29)	309 (2.33)
Native American	777 (1.48)	571 (1.46)	206 (1.55)
Other/Unknown	3,545 (6.76)	2,709 (6.92)	836 (6.31)
BMI, kg/m ²			
<18.5	1,556 (3.07)	1,156 (3.04)	400 (3.13)
18.5–24.9	30,486 (60.08)	22,664 (59.67)	7,822 (61.30)
25.0–29.9	16,500 (32.52)	12,516 (32.95)	3,984 (31.22)
>30	2,199 (4.33)	1,644 (4.33)	555 (4.35)
History of Asthma			
No	51,012 (98.50)	38,101 (98.49)	12,911 (98.54)
Yes	775 (1.50)	584 (1.51)	191 (1.46)
History of Shortness of Breath			
No	50,568 (97.71)	37,910 (98.09)	12,658 (96.62)
Yes	1,183 (2.29)	740 (1.91)	443 (3.38)
History of Team Sports Participation			
0	21,517 (42.08)	15,171 (39.78)	6,346 (48.84)
1	13,724 (26.84)	10,555 (27.68)	3,169 (24.39)
2	10,650 (20.83)	8,275 (21.70)	2,375 (18.28)
3 or More	5,240 (10.25)	4,136 (10.85)	1,104 (8.50)
Frequency of Weekly Exercise Before Enlistment			
0	2,268 (4.77)	1,575 (4.40)	693 (5.91)
1	5,560 (11.69)	3,625 (10.12)	1,935 (16.51)
2	7,768 (16.34)	5,437 (15.17)	2,331 (19.89)
3	11,450 (24.08)	8,532 (23.81)	2,918 (24.90)
4–5	13,406 (28.20)	10,724 (29.93)	2,682 (22.89)
6 or More	7,094 (14.92)	5,936 (16.57)	1,158 (9.88)
Frequency of Weekly Fast-Food Consumption Before Enlistment			
0	4,270 (8.32)	3,370 (8.80)	900 (6.90)
1	16,298 (31.75)	12,558 (32.80)	3,740 (28.68)
2–3	22,068 (42.99)	16,277 (42.51)	5,791 (44.41)
4–7	7,238 (14.10)	5,120 (13.37)	2,118 (16.24)
8–14	1,137 (2.22)	758 (1.98)	379 (2.91)
15 or More	319 (0.62)	208 (0.54)	111 (0.85)
Hours of Daily Television Watching Before Enlistment			
0	3,218 (6.26)	2,424 (6.32)	794 (6.08)
1	20,497 (39.88)	15,007 (39.14)	5,490 (42.03)
2–3	22,918 (44.58)	17,225 (44.93)	5,493 (43.58)
4 or More	4,770 (9.28)	3,685 (9.61)	1,085 (8.31)

BMI >30 kg/m². Fifty-eight percent had participated in organized sports during high school, 67% reported exercising at least three times/week, 60% ate fast-food more than once/week, and over 84% watched 1 to 3 hours of television per day, in the year before enlistment.

Univariate Analyses

Between-group comparison of current and former smokers revealed no statistically significant difference in run-speed ($p = 0.64$), so these groups were combined in subsequent

analyses as recruits with “any history of smoking.” The mean change in run-speed between baseline and final assessments was greater for smokers compared to nonsmokers (0.307 and 0.206 mph, respectively, $p < 0.0001$). The magnitude of this change was very consistent with an analysis restricted to current smokers (i.e., those who stopped within 30 days of arrival at training) versus nonsmokers. This further justified the combining of current and former smokers in subsequent analyses. Of note, at both baseline and final testing, as shown in Table II, smokers had significantly slower mean run-speeds than nonsmokers.

TABLE II. Mean Run-Speeds at Baseline and Final Fitness Testing and Changes in Run-speed by Population Characteristics

Characteristic	n (%)	Mean Baseline Run-Speed (mph)	p-Value	Mean Final Run- Speed (mph)	p-Value	Change in Run- Speed (mph)	p-Value
Smoking History			<0.0001		<0.0001		<0.0001
No	39,171 (74.7)	8.339		8.546		0.206	
Yes	13,248 (24.3)	8.176		8.482		0.307	
BMI, kg/m ²			<0.0001		<0.0001		<0.0001
<18.5	1,556 (3.07)	8.322		8.435		0.112	
18.5–24.9	30,486 (60.08)	8.475		8.602		0.127	
25.0–29.9	16,500 (32.52)	8.039		8.430		0.391	
>30.0	2,199 (4.33)	7.804		8.294		0.490	
History of Asthma			0.277		0.069		0.664
No	51,012 (98.50)	8.298		8.530		0.232	
Yes	775 (1.50)	8.267		8.488		0.222	
History of Shortness of Breath			<0.0001		<0.0001		<0.0001
No	50,568 (97.71)	8.303		8.533		0.230	
Yes	1,183 (2.29)	8.082		8.384		0.302	
History of Team Sports Participation			<0.0001		<0.0001		<0.0001
0	21,517 (42.08)	8.115		8.394		0.280	
1	13,724 (26.84)	8.299		8.535		0.236	
2	10,650 (20.83)	8.498		8.673		0.175	
3 or More	5,240 (10.25)	8.653		8.792		0.139	
Frequency of Weekly Exercise Before Enlistment			<0.0001		<0.0001		<0.0001
0	4,270 (8.32)	8.353		8.390		0.325	
1	16,298 (31.75)	8.319		8.348		0.348	
2	22,068 (42.99)	8.281		8.422		0.314	
3	7,238 (14.10)	8.276		8.495		0.247	
4–5	1,137 (2.22)	8.289		8.584		0.162	
6 or More	319 (0.62)	8.235		8.713		0.043	
Frequency of Weekly Fast-Food Consumption			<0.0001		0.006		<0.0001
0	4,270 (8.32)	8.353		8.540		0.187	
1	16,298 (31.75)	8.319		8.542		0.222	
2–3	22,068 (42.99)	8.281		8.526		0.245	
4–7	7,238 (14.10)	8.276		8.516		0.240	
8–14	1,137 (2.22)	8.289		8.488		0.199	
15 or More	319 (0.62)	8.235		8.508		0.273	
Hours of Daily Television Watching			<0.0001		<0.0001		<0.0001
0	3,218 (6.26)	8.451		8.581		0.130	
1	20,497 (39.88)	8.376		8.573		0.198	
2–3	22,918 (44.58)	8.243		8.504		0.261	
4 or More	4,770 (9.28)	8.129		8.428		0.299	

Table II shows that mean run-speeds improved, on average, for all groups between the two time points. All variables of interest were found to have a statistically significant association with run-speed, with the exception of history of asthma. Characteristics associated with slower run-speeds at baseline and follow-up assessments included being overweight or obese (BMI ≥ 25.0 kg/m²), history of shortness of breath, less high school team participation, fewer exercise events per week, greater fast-food consumption, and greater television watching in the year before enlistment. These same characteristics were also associated with the greatest improvements in run-speed between the two assessments. Since self-reported asthma history did not have a statistically significant effect on run-speed, this variable was excluded from the subsequent multivariable regression analysis.

Multivariable Regression Analysis

Of the 52,419 individuals in this population, 45,571 had no missing values for any covariate and were included in the regression analysis. All seven significant univariate characteristics were included in the model, as well as age and race/ethnicity. For covariates with categories that spanned multiple values, the lower end of the range was assumed. The variance inflation factors were below 4 for all covariates in the model, and all seven covariates remained significant in the final regression model. The largest improvements in run-speeds were observed among those with higher BMI at entry, any smoking history, more frequent television watching, greater fast-food consumption, and history of shortness of breath. Table III shows the standardized beta coefficients for the multivariable model. The amount of variability explained for the change in run-speed (r^2) was 0.09. BMI at entry,

TABLE III. Characteristics Associated With Changes in Run-Speed by Multivariable Linear Regression

Characteristic	Beta Coefficient	Standard Error	p-Value	Standardized Beta Coefficient
BMI at Entry, kg/m ²	0.0457	0.00086	<0.0001	0.2428
Frequency of Weekly Exercise	-0.0556	0.00184	<0.0001	-0.1439
History of Team Sports Participation	-0.0364	0.00293	<0.0001	-0.0589
Hours of Daily Television Watching	0.0324	0.00301	<0.0001	0.0489
Smoking History	0.0691	0.00668	<0.0001	0.0473
Frequency of Weekly Fast-Food Consumption	0.0078	0.00161	<0.0001	0.0218
History of Shortness of Breath	0.0452	0.01884	0.0165	0.0108

exercise frequency, and high school sports participation had the largest influence in the model of changes in run-speed.

DISCUSSION

Young men who smoked cigarettes and were forced to abstain from smoking over a 12-week period experienced significantly greater improvement in their aerobic fitness, as measured by running speed, when compared with their non-smoking peers. Additionally, physical performance, based on run-speed, was superior at both baseline and follow-up testing among nonsmokers who completed recruit training, demonstrating the benefits of abstinence. In summary, since abstinence and cessation of smoking among young adult men improves physical aerobic performance, these results may be useful in promoting smoking prevention and cessation among young adults.

Smokers consistently have poorer performance on pulmonary function tests, such as lower values for forced expiratory volume in 1 second (FEV1).^{11,19} Additionally, they have lower levels of fitness in terms of VO₂ max compared to nonsmokers.^{10,20} Compromised physiologic testing also translates into inferior functional testing, with smokers typically performing worse on scored physical fitness tests. This difference widens with increased smoking.¹¹ Not surprisingly, in the current study, smokers ran slower than nonsmokers at baseline. Several prior studies that have evaluated physical performance and tobacco use were predominately carried out in the military, firefighting, or police forces and involved matching smokers with nonsmokers. Most of these studies showed that both adult and adolescent smokers were consistently slower and had poorer muscular endurance compared to their matched counterparts.^{12,21-26} Only a few studies have demonstrated no differences between smokers and non-smokers on muscular endurance or run-speed.^{21,24} Our study is unique in demonstrating that, in a controlled setting, and after adjusting for several behavioral factors, cessation of smoking among young adult men independently improved physical aerobic performance.

Poorer physical performance among smokers is likely multifactorial. One of the most important considerations is baseline physical activity. It has been shown that, in general, smokers are more sedentary than nonsmokers. Heavy smokers have been found to be only one-half to two-thirds as likely to engage in strenuous activity as their nonsmoking

counterparts.²⁷ In our study, smoking was inversely associated with baseline activity levels and sports participation. Among older tobacco users, smokers have a heightened sense of perceived exertion compared with nonsmokers, even after controlling for degree of fitness,²⁸ although this difference has not been consistently shown in younger smokers.²⁹ Therefore, lower levels of physical activity among smokers may be either a direct effect of tobacco use or represent part of a lifestyle choice that includes tobacco. Regardless of the nature of this association, it is notable that the young adults in this study had significant improvements in performance after smoking cessation, even when adjusting for multiple measures of baseline physical activity and lifestyle.

One potential negative side effect of smoking cessation is weight gain, which has been reported to average 4 to 5 kg in the first several months after cessation.^{30,31} Although the relationship between weight and smoking is less strong in young people, including military recruits,³² and weight changes after cessation may be less pronounced in younger populations,³³ increased weight gain may offset the potential increases in pulmonary function, resulting in a net neutral improvement in overall physical performance. In our study, we did not have post-training BMI data available, however, other studies have suggested that forced smoking cessation in basic training is not associated with weight gain.³⁴ When controlling for at least baseline BMI, we found improvements in run-speed associated with smoking cessation.

Although 3 months may be considered a brief time to observe improvements in aerobic fitness, other studies have demonstrated that the benefits of smoking cessation manifest rather rapidly. Smokers who quit have been shown to have improved physical endurance within the first week after cessation.³⁵ Large cohort studies have demonstrated that benefits may be maintained over a lifetime; sustained quitters had significantly slower declines in FEV1 or postbronchodilator FEV1 compared to those who continued to smoke.^{36,37} Nonetheless, it may be considered an impressive finding in the current study that improvements were noted in such a young, fit cohort within only a few months after cessation. Although some young adults may return to smoking or initiate tobacco use after basic training,⁶ maintenance of cessation has clear physiologic benefits that may be leveraged to encourage lifetime tobacco avoidance.

In addition to smoking, we found several other factors associated with aerobic fitness, as measured by running

speed. Although less than 10% of the variance in run-speed was explained by smoking history ($r^2 = 0.09$), the greatest improvement in speed was observed among those who had the highest baseline BMIs. It is important to note that among U.S. Marine Corps recruits, elevated BMI may represent dense muscle mass rather than obesity, although our results are consistent with an assumption that higher BMI at the start of training may have been related to overweight or obesity since it was also associated with lower fitness. It is notable that, in our study, all groups increased their mean running speed despite having to run twice as far on their final test, a finding likely related to the intensity of recruit training.

There are several limitations that should be considered when interpreting the results of these analyses. Because there are no female Marines trained in San Diego, this cohort included only healthy young men in U.S. military training; therefore, results cannot be generalized to women or other populations. Data from the recruit survey, used to define preservice smoking and potential confounding behavioral health attributes, were subject to the categorical definitions of the variables as well as potential recall bias. Not all potentially confounding variables were included in modeling. For example, although preservice alcohol use may be concerning in this cohort, and alcohol use has been strongly associated with preservice tobacco use,³⁸ youth alcohol use has not been consistently associated with physical fitness³⁹ and, therefore, alcohol use was not included in these analyses. Although data collection was complete for all recruits who finished basic training, no data were available for those who dropped out, were injured, or were otherwise physically unable to complete training. Past studies have demonstrated that tobacco users are somewhat less likely to complete their first-term enlistment; nonetheless, attrition from basic training is considered a multifaceted and complex issue.⁴⁰ Defining fitness by aerobic run-times is also subject to inherent limitations, including the phenomenon that those who have initial slow speeds have greater potential to improve than those who begin with faster speeds. Physical performance was measured by different aerobic running distances at the beginning (1.5 miles) and completion (3.0 miles) of training. This is not necessarily a limitation based on the assumption that most individuals will have a slower run-speed if the distance is doubled from 1.5 to 3.0 miles. Because recruits significantly increased their running speeds between the initial 1.5-mile run and the final 3.0-mile run, actual aerobic improvement resulting from smoking cessation would likely have been more dramatic if quantified by equivalent running tests.

These findings may have important public health implications. Smoking cessation interventions among adolescents and young adults have proven particularly challenging, with very low success rates observed when motivation to quit is inconsistent⁴¹ and peer influences are present.⁴² Motivation to avoid or quit smoking, however, has been strongly related to athletic performance, particularly in young men.⁷⁻⁹ Public health messages have traditionally focused on frightening

statistics or images of the long-term negative health consequences of smoking,⁴³ but rarely leveraged the positive near-term benefits of smoking cessation. A message that quitting smoking could result in significant improvement in running speed, within as little as 3 months, and independent of any other training efforts, may resonate strongly with young adults who are motivated by their athletic performance. In the military, fitness is a source of pride, a requirement for promotion, and a high operational priority.¹⁵ Despite the military's historic culture of tobacco use,⁴⁴ tobacco avoidance or cessation messages that include quantifiable fitness benefits could be successfully incorporated in basic training, semiannual physical fitness testing, and ongoing antitobacco campaigns.^{45,46}

In summary, we demonstrated significant improvement in physical performance, as measured by aerobic running speed, among young men after forced smoking cessation in military basic training. Improvement in performance was achieved over a 3-month period and quantified in smokers, independent of other behavioral lifestyle factors, such as sports participation, that might have confounded results. Estimates were conservative and more profound improvements in physical performance would likely be observed in a population that was older or less physically fit at baseline evaluation. Because the positive near-term benefits of smoking cessation may be underutilized in public health messages, evaluation of the impact of these results on young adults merits further exploration.

ACKNOWLEDGMENTS

We are indebted to both the participants and the Recruit Assessment Program support team at the Naval Health Research Center, especially Dr. Christopher Phillips, Dr. Nancy Crum-Cianflone, Lauren Kipp, Dennis Hernandez, and Kartavya Vyas. This work was supported by the Department of Defense under Naval Health Research Center work unit 61133 and performed under institutional review board-approved protocol NHRC.2000.0003.

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1. Report Date (DD MM YY) 12 12	2. Report Type Journal Article	3. DATES COVERED (from - to) Jan 2002 – Dec 2006	
4. TITLE AND SUBTITLE Smoking Cessation and Improvement in Physical Performance among Young Men		5a. Contract Number: 5b. Grant Number: 5c. Program Element: 5d. Project Number: 5e. Task Number: 5f. Work Unit Number: 61133 5g. IRB Protocol Number: 2000.0003	
6. AUTHORS Jeffrey H. Feinberg, Margaret A. K. Ryan, Michael Johns, Blake A. Marvin, James E. Reading, & Martin R. White		8. PERFORMING ORGANIZATION REPORT NUMBER Report No. 13-04	
7. PERFORMING ORGANIZATION NAME(S) AND ADDRESS(ES) Naval Health Research Center P.O. Box 85122 San Diego, CA 92186-5122			
8. SPONSORING/MONITORING AGENCY NAMES(S) AND ADDRESS(ES) <table border="0"><tr><td>Commanding Officer Naval Medical Research Center 503 Robert Grant Ave Silver Spring, MD 20910-7500</td><td>Chief, Bureau of Medicine and Surgery 7700 Arlington Blvd, Suite 5117 Arlington, VA 220402-5117</td></tr></table>			Commanding Officer Naval Medical Research Center 503 Robert Grant Ave Silver Spring, MD 20910-7500
Commanding Officer Naval Medical Research Center 503 Robert Grant Ave Silver Spring, MD 20910-7500	Chief, Bureau of Medicine and Surgery 7700 Arlington Blvd, Suite 5117 Arlington, VA 220402-5117		
		10. Sponsor/Monitor's Acronyms(s) NMRC / BuMed	
		11. Sponsor/Monitor's Report Number(s)	

12 DISTRIBUTION/AVAILABILITY STATEMENT
Approved for public release; distribution unlimited.

13. SUPPLEMENTARY NOTES
Military Medicine, 2015, 180(3), 343-49

14. ABSTRACT (maximum 200 words)
Tobacco use among young adults is a major public health challenge. Near-term benefits of cessation may motivate active young people to quit or avoid smoking. Military basic training includes mandatory tobacco cessation, as well as uniform physical conditioning regimes, creating an opportunity to evaluate changes in physical performance metrics in direct relation to smoking cessation. These analyses included data from all men who completed Marine Corps recruit training in San Diego, California, between 2002 and 2006. Recruits reported tobacco use and other health metrics on a pretraining survey. Initial and final aerobic run-times were recorded over the 3-month training period. Multivariable linear regression analyses assessed changes in run-speed relative to pre-enlistment smoking history. Among 52,419 young men included in analyses, 13,248 (25.3%) reported smoking before enlistment. Average run-speeds improved among all groups of recruits; however, improvement was greater among prior smokers compared to recruits with no history of smoking (average increase of 0.31 vs. 0.21 miles per hour) and statistically significant in multivariate analyses. Smoking cessation in this cohort of young men resulted in improved physical aerobic performance, independent of other behavioral health characteristics. These data may be useful in promoting and motivating smoking cessation among young, active adults.

14. SUBJECT TERMS
Tobacco use, public health challenge, military recruits, Smoking cessation

16. SECURITY CLASSIFICATION OF:			17. LIMITATION OF ABSTRACT UNCL	18. NUMBER OF PAGE 9	18a. NAME OF RESPONSIBLE PERSON Commanding Officer
a. REPORT UNCL	b. ABSTRACT UNCL	c. THIS PAGE UNCL			18b. TELEPHONE NUMBER (INCLUDING AREA CODE) COMM/DSN: (619) 553-8429